



# ASSASSIN'S CREED III

## HOMESTEAD

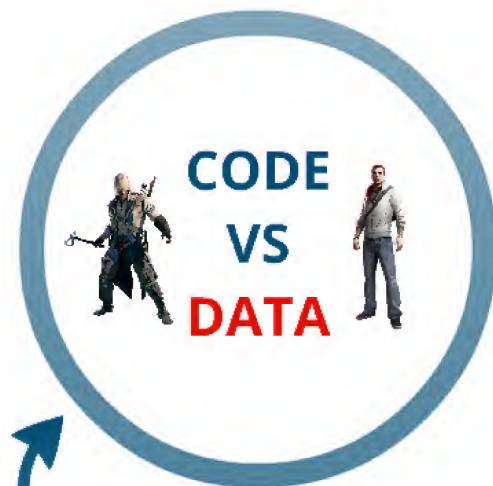
CODE, DATA AND TOOLS

Pierre-Luc Vachon  
Gameplay Programmer  
Ubisoft Québec

**DATA IS POWERFUL  
BUT DANGEROUS**



**CREATIVE AND  
FLEXIBLE TOOLS**



**GENERIC CODE  
EMBRACE DATA**

**CODE**  
**VS**  
**DATA**



# CODE-DRIVEN

BEHAVIORS AND INTERACTIONS  
CREATED WITH CODE LOGIC

CLASSIC



OLD-SCHOOL





# CODE-DRIVEN

BEHAVIORS AND INTERACTIONS  
CREATED WITH CODE LOGIC

CLASSIC



OLD-SCHOOL



THE PROGRAMMER IS DOING ALL THE WORK

PROS

CONS

# PROS

**SHARED** FOR EACH IMPLEMENTATIONS  
**OPTIMIZED**

NO LIMIT

**ERRORS** ARE EASY TO IDENTIFY

LOT OF POWERFUL

**TOOLS** FOR DEBUG

# CONS

LOT OF **COMMUNICATION**  
**DELAYS** IN LARGE SCALE  
PRODUCTION  
SIMPLE FEATURES CAN BE **COSTLY**  
**FLEXIBILITY**

# DATA-DRIVEN BEHAVIORS AND INTERACTIONS CREATED WITH DATA LOGIC

MODERN



CREATOR-FRIENDLY





# DATA-DRIVEN BEHAVIORS AND INTERACTIONS CREATED WITH DATA LOGIC

MODERN



CREATOR-FRIENDLY



THE DESIGNER OR INTEGRATOR IS DOING THE WORK

PROS

CONS

# PROS

**FAST** ITERATIONS

LESS **COMMUNICATION**

**EASY** TO CREATE SPECIFIC CASES

ALMOST NO **DOWNTIME**

# CONS

MIGHT NOT BE OPTIMAL  
**SPECIFIC** INSTANCES  
HARD TO MANAGE AND DEBUG  
**COMPLEXITY**

**CODE**  
**VS**  
**DATA**





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The **HOMESTEAD**

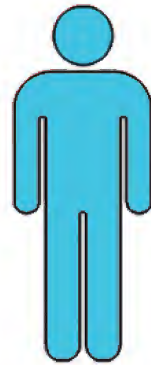


# THE HOMESTEAD

Monteriggioni V2.0



**BUILDING ON**  
**ASSASSIN'S CREED**  
**TECHNOLOGY**



**CHARACTERS ARE LIKE**  
**PUPPETS**



# UNIQUE CHARACTERS









# UNIQUE CHARACTERS



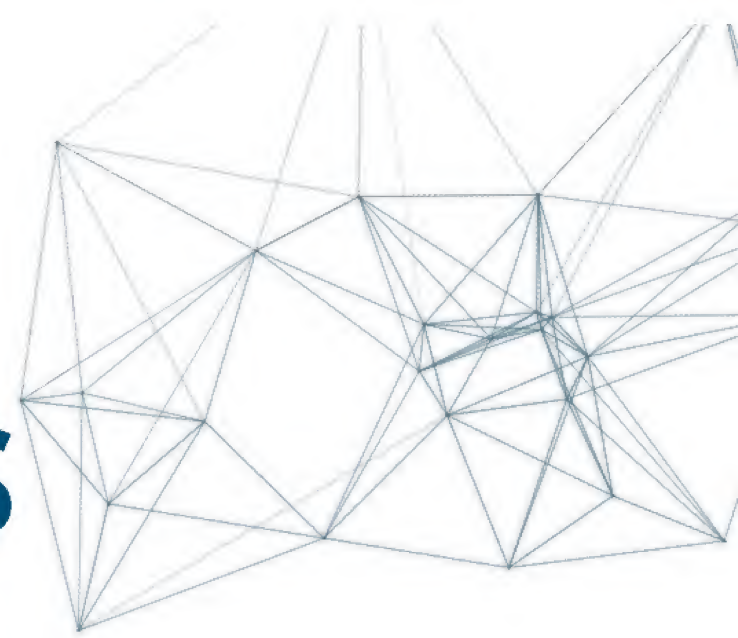


# WHAT WE WANT



NPC TO **BEHAVE** AS CLOSE AS A **REAL LIFE** CHARACTER  
WITH A FULL DAY OF **INTERACTIONS**  
WITHOUT **TRANSITIONS** OR **GLITCHES**

# FEATURES



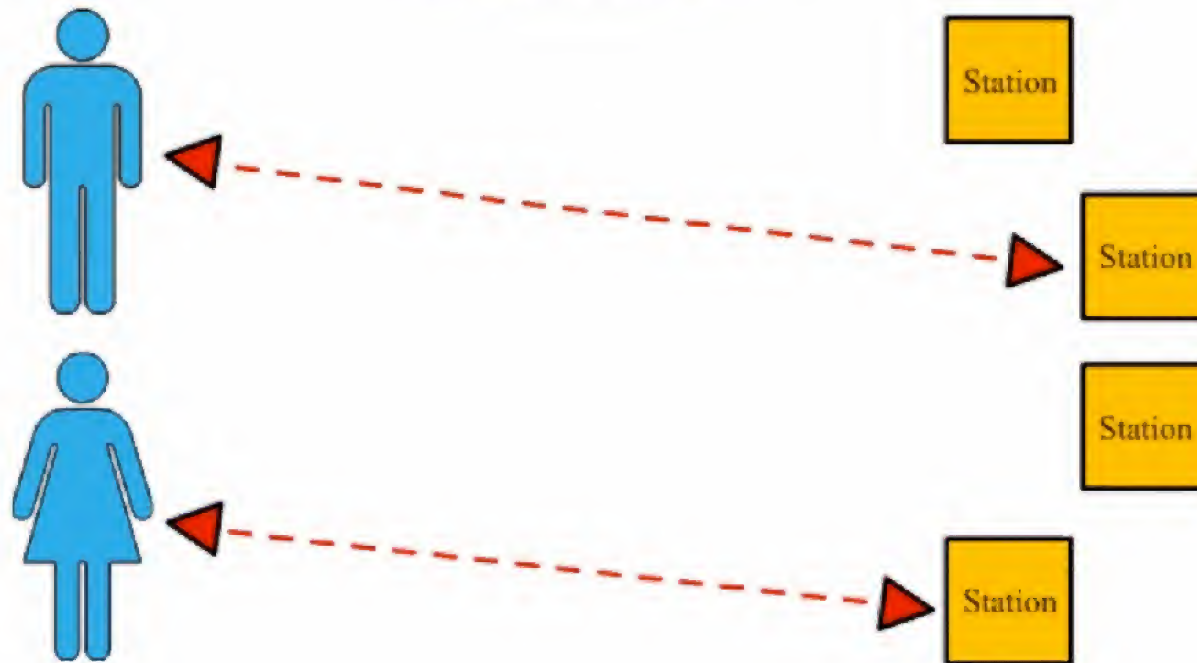
NPC IS **UNIQUE** AND INFLUENCED BY **PARAMETERS**  
**NON-STOP** GENERIC OR SPECIFIC ACTIVITIES  
NPC CAN **INTERACT**  
**MAXIMUM** QUALITY

# **FIRST PROTOTYPE**

**A MANAGER IS HANDLING EACH NPC**



**Manager**





# **FIRST PROTOTYPE**

A MANAGER IS HANDLING EACH NPC



**THIS IS MOSTLY A CODE-DRIVEN SOLUTION**

# FIRST PROTOTYPE

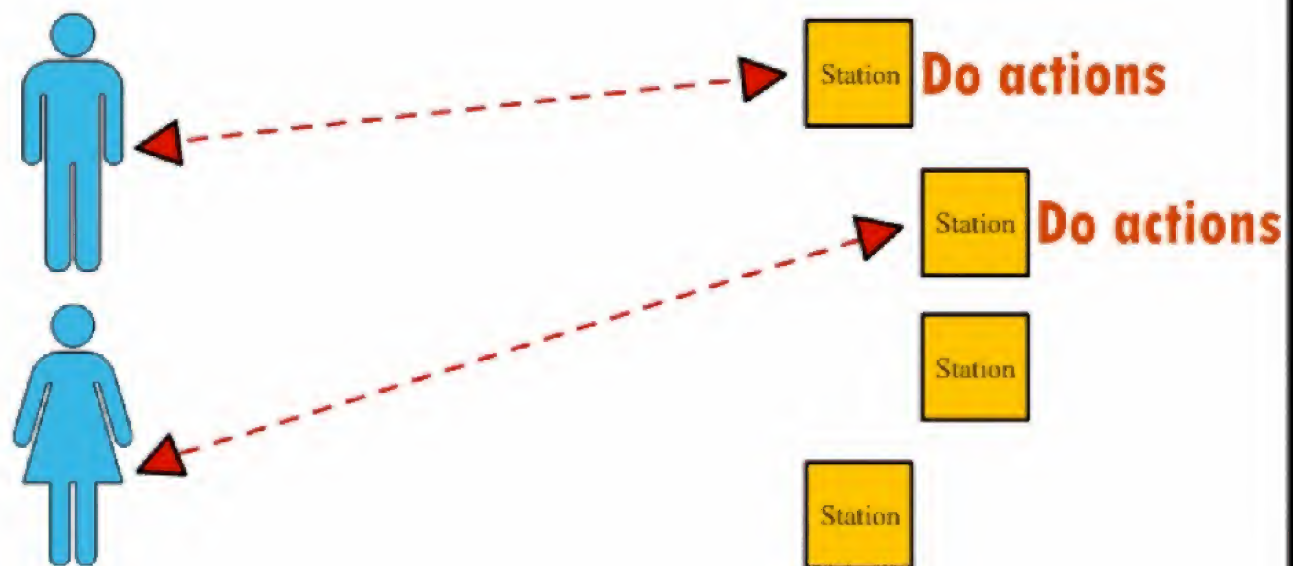


LOT OF DUPLICATION

# SECOND PROTOTYPE



NO MANAGER, **ALL STATIONS ARE INDEPENDENT**







**THIS IS MOSTLY A DATA-DRIVEN SOLUTION**

# **SECOND PROTOTYPE**

**COLLABORATION** WITH OTHER STUDIOS  
**GENERIC** SOLUTION

# **COMPLEXITY**

# GYM



ENSURE THAT WE **CAN DO IT**  
**REFERENCE** FOR THE TEAM

# PRODUCTION



WOODWORKER  
**AND**  
HUNTRESS



REAL  
**PROBLEMS**  
EMERGED

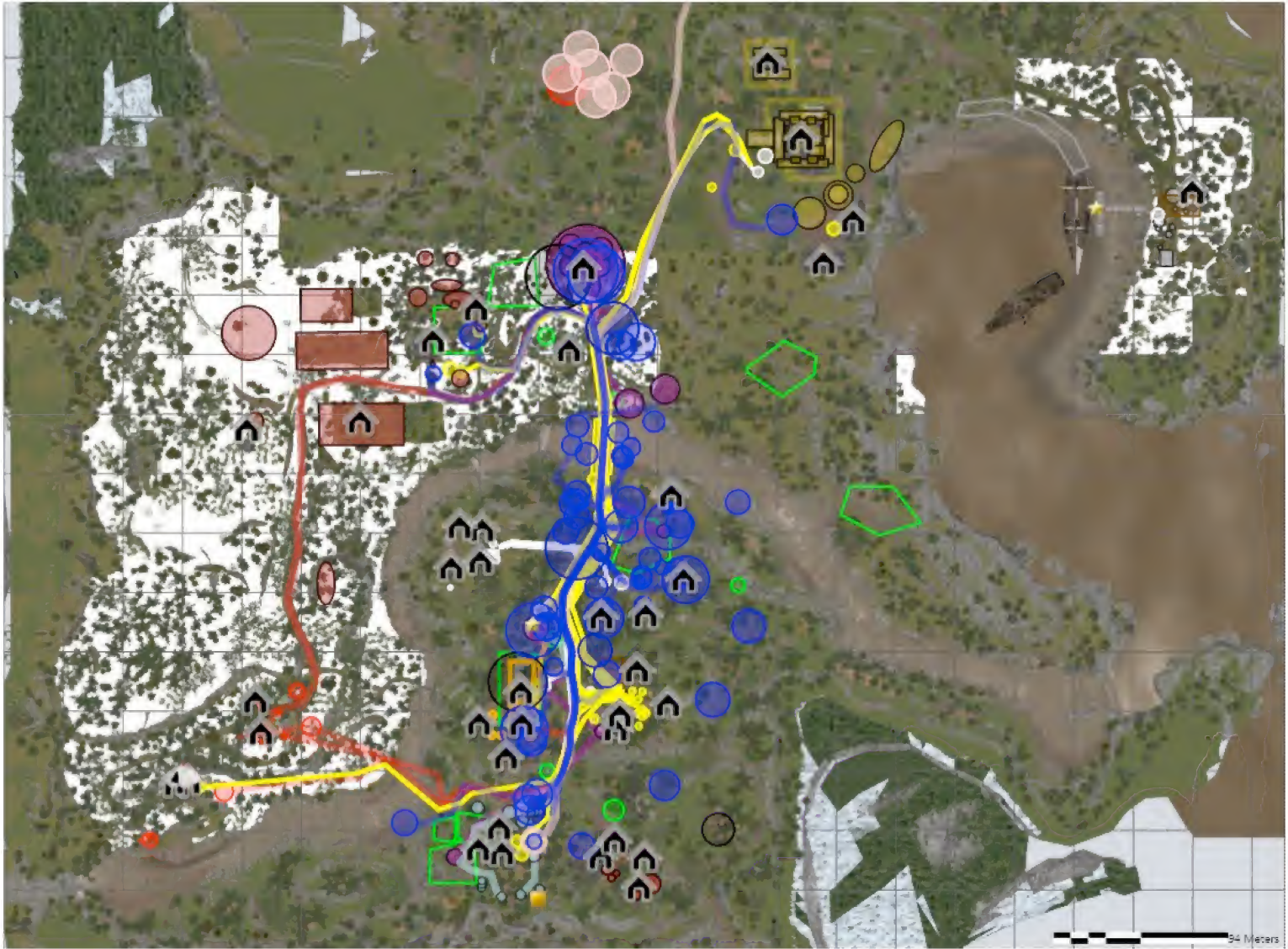


USING **DATA** SETUP  
WE CREATED **CLUSTERS**

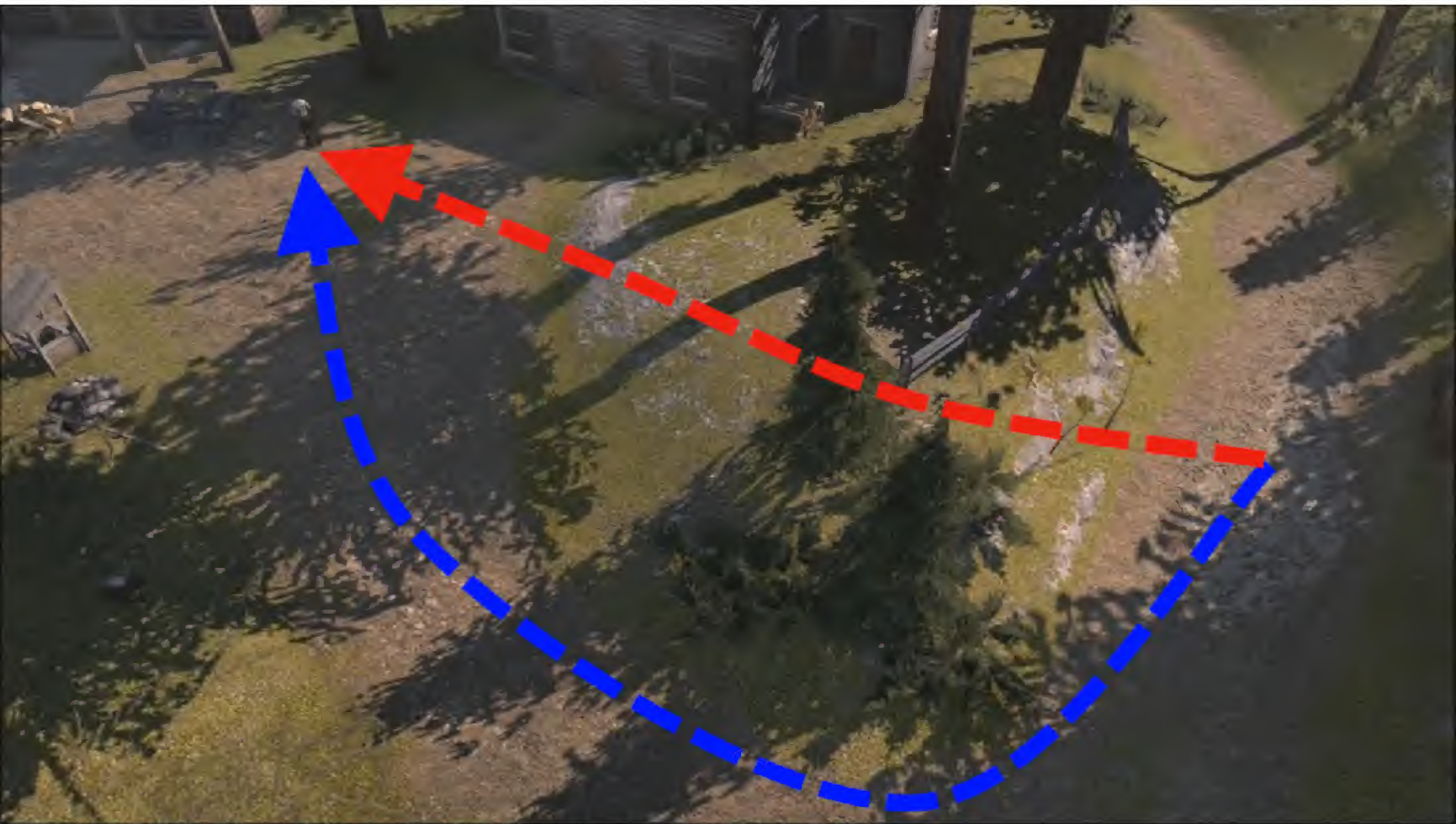
**NAVIGATION**

**HOMESTEAD LAYOUT BRINGS**

**LONG DISTANCE**









~~WE DON'T WANT THE BEST PATH~~  
WE WANT THE NICEST PATH



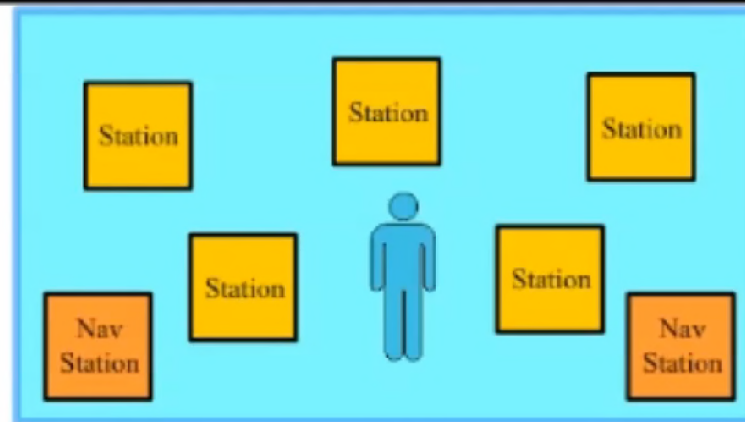


USING **DATA** SETUP **CLUSTERS**  
WE CREATED

**NAVIGATION**

**HOMESTEAD LAYOUT BRINGS**

**ONE DISTANCE**



AND PICKING THROUGH YOUR TRASH.

WE CREATED A SMALL TRACKING CLASS

OMNI NPC

NPC CAN SPAWN

AT  
MULTIPLE PLACES

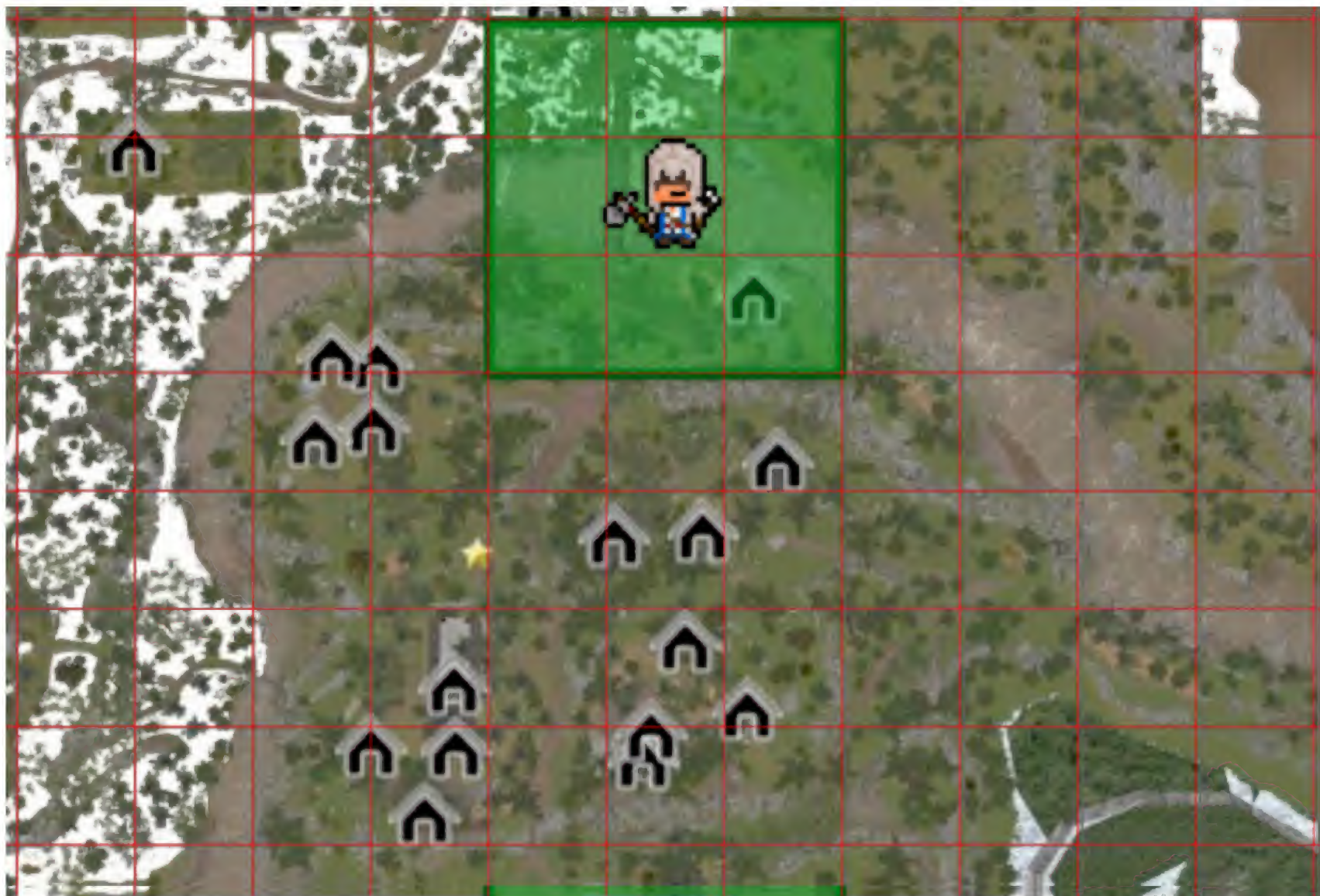
WE CAN ENSURE IT TO BE UNIQUE

...BUT WHAT ABOUT  
BEING CONSISTENT?









AND PICKING THROUGH YOUR TRASH.

WE CREATED A SMALL TRACKING CLASS

OMNI NPC

NPC CAN SPAWN

AT  
MULTIPLE PLACES

WE CAN ENSURE IT TO BE UNIQUE

...BUT WHAT ABOUT  
BEING CONSISTENT?









**BIG BROTHER**



**IS WATCHING  
YOU, LISTENING  
IN ON YOUR CALLS,  
READING YOUR EMAIL,  
INSPECTING YOUR INTERNET HABITS,  
AND PICKING THROUGH YOUR TRASH.**

**WE CREATED A SMALL TRACKING CLASS**

**OMNI NPC**

**NPC CAN SPAWN  
AT  
MULTIPLE PLACES**



Terry was here  
13:07





**WE HAVE TO MANUALLY  
SET IT IN EACH STATION**



W  
IN



**WE REALLY WANTED  
TO HAVE "REAL"  
INDOOR/OUTDOOR  
TRANSITIONS**





WE WANTED TO **SEE** OUR NPC  
**DOING** THOSE **TRANSITIONS**

HOW CAN WE **ACHIEVE** THIS?

WE BRING BACK **COURTESY**





# DOING THOSE **TRANSITIONS**

HOW CAN WE **ACHIEVE** THIS?

WE BRING BACK **COURTESY**





# POST-PRODUCTION

**20** UNIQUE NPC

**500+** UNIQUE STATIONS

**2000+** PARAMETERS

## WAS IT A GOOD IDEA ?

MAYBE NOT THE  
**DECT**

**"IT'S ONE OF THE GREAT TRAGEDY  
OF LIFE — SOMETHING  
ALWAYS  
CHANGES."**



**-Dr. Gregory House**



**500+** UNIQUE STATIONS

**2000+** PARAMETERS

**WAS IT A GOOD IDEA ?**

MAYBE NOT THE  
**BEST**

BUT SURELY NOT THE  
**WORST**

**HOW CAN WE DO BETTER ?**



FUL  
S



The **HOMESTEAD**

**TOOLS**



# EDITOR





WHY NOT CREATE OUR  
OWN **TOOLS** IN IT ?





WHY NOT CREATE OUR  
OWN **TOOLS** IN IT ?

**COST TIME AND MONEY**  
USED BY A **SMALL FRACTION** OF THE TEAM  
**MAINTENANCE**  
**STABILITY**

# THE FORGOTTEN

YOU ALL **USED** IT AND **KNOW** IT



Homestead_Balancing_Aug01 [Compatibility Mode] - Microsoft Excel																
<div> <div>File Home Insert Page Layout Formulas Data Review View Add-Ins Acrobat</div> <div> <div>Clipboard</div> <div> <div>Cut Copy Paste</div> <div>Format Painter</div> </div> </div> <div> <div>Font</div> <div> <div>Calibri 11</div> <div> <div>Font Color</div> <div>Background Color</div> </div> </div> <div> <div>Paragraph</div> <div> <div>Align Left</div> <div>Align Center</div> <div>Align Right</div> <div>Justify</div> </div> <div> <div>Decrease Indent</div> <div>Increase Indent</div> </div> </div> <div> <div>Number</div> <div> <div>General</div> <div>Text</div> <div>Percentage</div> <div>Comma</div> </div> </div> <div> <div>Conditional Formatting</div> <div>Format as Table</div> </div> <div> <div>Check Cell</div> <div>Explanatory...</div> <div>Input</div> <div>Linked Cell</div> <div>Note</div> </div> </div> <div> <div>Cells</div> <div> <div>Insert</div> <div>Delete</div> <div>Format</div> </div> <div> <div>AutoSum</div> <div>Fill</div> <div>Clear</div> </div> <div> <div>Sort &amp; Filter</div> <div>Select</div> </div> </div> </div>																
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<div> <div>Time</div> <div>Replay</div> <div>Startup</div> <div>DBR :</div> <div>DBR :</div> <div>DBR :</div> <div>DBR :</div> <div>DBR :</div> <div>DBR :</div> <div>DBR :</div> <div>DBR :</div> <div>DBR :</div> <div>DBR :</div> <div>DBR :</div> <div>DBR :</div> <div>DBR :</div> <div>DBR :</div> </div>																
<div> <div>Time Sta</div> <div>End</div> <div>Unlock Lev</div> <div>Mode</div> <div>Replay Del</div> <div>Startup Condition</div> <div>Mod</div> <div>Delay</div> <div>Distance</div> <div>y 0</div> <div>1</div> <div>Probability</div> <div>Spawn 0 Priority</div> <div>Spawn 1 Priority</div> <div>Spawn 2 Priority</div> <div>Spawn 3 Priority</div> </div>																
30	GPI_DOC_LYLE_CCLS_PickingHerbs_SPW_CRD	0x37e6c7b2c	6	20	Doctor_Level1GameplayCo	150	CheckAfterDelay	3,5	0	50	250	0	SpawningPriority_Level1			
31	GPI_DOC_LYLE_CCLS_CheckingCrops_SPW_CRD	0x37e17744c	6	20	Doctor_Level1GameplayCo	150	CheckAfterDelay	3,5	0	50	250	0	SpawningPriority_Level1			
32	GPI_BLACK_DAVE_CCLS_HouseToInn_MID_CRD	0x36b33f14e	6	18	Blacksmith_LeGameplayCo	10	CheckAfterDelay	1	0	50	250	0	SpawningPriority_Level2			
33	GPI_INN_DIA_TER_CCLS_Coupleatbar_SPW_CRD	0x362d14a16	18	24	Lumberer_LevGameplayCo	150	CheckAfterDelay	10					SpawningPriority_Level2			
34	GPI_WW_LAN_CCLS_Inspectingwheelbarrow_MID_CRD	0x361c8b843	6	18	Woodworker_GameplayCo	150	CheckAfterDelay	3,5	0	50	250	0	SpawningPriority_Level2			
35	GPI_LUMB_DIA_CCLS_Exithouse_01_SPW_CRD	0x360f6c3f6	6	18	GameplayCo	150	CheckAfterDelay	3,5	0	50	250	0	SpawningPriority_Level2			
36	GPI_LUMB_GOD_CCLS_Exithouse_SPW_CRD	0x36070dbc0	6	18	Lumberer_LevGameplayCo	150	CheckAfterDelay	3,5	0	20	250	0	SpawningPriority_Level2			
37	GPI_LUMB_CAT_CCLS_Exithouse_SPW_CRD	0x35fdec762	6	18	Lumberer_LevGameplayCo	150	CheckAfterDelay	3,5	0	50	250	0	SpawningPriority_Level2			
38	GPI_LUMB_CAT_CCLS_Goto_Bedtime_Winter_END_CRD	0x359eab5ed	0	24	Lumberer_LevGameplayCo	10							SpawningPriority_Level2			
39	GPI_LUMB_GOD_CCLS_Goto_Bedtime_Winter_END_CRD	0x356bb6aea	0	24	Lumberer_LevGameplayCo	10							SpawningPriority_Level2			
40	GPI_LUMB_DIA_CCLS_Gotosleep_Winter_01_END_CRD	0x356bb47ba	0	24	GameplayCo	10							SpawningPriority_Level2			
41	GPI_LUMB_DIA_CCLS_Gotosleep_Winter_02_END_CRD	0x356bb46ec	0	24	Lumberer_LevGameplayCo	10							SpawningPriority_Level2			
42	GPI_LUMB_GOD_CCLS_HouseToInn_MID_CRD	0x3530b1565	6	18	Lumberer_LevGameplayCo	10	CheckAfterDelay	1	0	50	250	0	SpawningPriority_Level2			
43	GPI_LUMB_DIA_CCLS_Exithouse_02_SPW_CRD	0x351e61971	6	18	Lumberer_LevGameplayCo	150	CheckAfterDelay	3,5	0	50	250	0	SpawningPriority_Level2			
44	GPI_LUMB_TER_CCLS_Exithouse_02_SPW_CRD	0x351a3a812	6	18	Lumberer_LevGameplayCo	150	CheckAfterDelay	3,5	0	20	250	0	SpawningPriority_Level2			
45	GPI_BLACK_DAVE_CCLS_Exithouse_SPW_CRD	0x3518bffa5	6	18	Blacksmith_LeGameplayCo	150	CheckAfterDelay	3,5	0	50	250	0	SpawningPriority_Level2			
46	GPI_BLACK_DAVE_CCLS_Go_Home_Bedtime_WINTER_END_CRD	0x35126c931	6	24	Blacksmith_LeGameplayCo	10							SpawningPriority_Level2			
47	GPI_LUMB_TER_CCLS_Exithouse_01_SPW_CRD	0x350898162	6	18	GameplayCo	150	CheckAfterDelay	3,5	0	20	250	0	SpawningPriority_Level2			
48	GPI_LUMB_TER_CCLS_HouseToSawmill_MID_CRD	0x34f44279e	6	18	Lumberer_LevGameplayCo	10	CheckAfterDelay	1	0	50	250	0	SpawningPriority_Level2			
49	GPI_LUMB_GOD_CCLS_SawmillTo_House_MID_CRD	0x34ec95522	0	24	Lumberer_LevGameplayCo	10	CheckAfterDelay	1	0	50	250	0	SpawningPriority_Level2			
50	GPI_TAIL_ELI_CCLS_Exithouse_SPW_CRD	0x34e5a26f9	6	17	Tailor_Level1_GameplayCo	150	CheckAfterDelay	3,5	0	50	250	0	SpawningPriority_Level3			
51	GPI_INN_OLI_CCLS_Exithouse_SPW_CRD	0x34e324dcf	6	12	Innkeeper_Le_GameplayCo	150	CheckAfterDelay	3,5	0	50	250	0	SpawningPriority_Level3			
52	GPI_WW_LAN_CCLS_Exithouse_SPW_CRD	0x34e035db5	6	18	Woodworker_GameplayCo	150	CheckAfterDelay	3,5	0	50	250	0	SpawningPriority_Level2			
53	GPI_LUMB_TER_CCLS_SawmillTo_House_MID_CRD	0x34e01494d	0	24	Lumberer_LevGameplayCo	10	CheckAfterDelay	1	0	50	250	0	SpawningPriority_Level2			
54	GPI_LUMB_GOD_TER_CCLS_Enteringsawmill_SPW_CRD	0x338c0a5a9	6	19	Lumberer_LevGameplayCo	150	CheckAfterDelay	3,5	0	80	250	0	SpawningPriority_Level2			
55	GPI_WW_LAN_CCLS_ShovellingSnow_MID_CRD	0x3441f85bd	6	18	Woodworker_GameplayCo	100	CheckAfterDelay	3,5	0	50	250	0	SpawningPriority_Level1			
56	GPI_LUMB_TER_CCLS_Fishing_Seated_MID_CRD	0x3384c5478	6	18	Lumberer_LevGameplayCo	150	CheckAfterDelay	3,5	0	50	250	0	SpawningPriority_Level2			
57	GPI_LUMB_TER_CCLS_CheckingCrops_02_MID_CRD	0x336be668d	6	20	Lumberer_LevGameplayCo	150	CheckAfterDelay	3,5	0	50	250	0	SpawningPriority_Level2			
58	GPI_LUMB_TER_CCLS_CheckingCrops_01_MID_CRD	0x336be5ecd	6	20	Lumberer_LevGameplayCo	150	CheckAfterDelay	3,5	0	50	250	0	SpawningPriority_Level2			
59	GPI_TAIL_ELI_CCLS_Smoking_Winter_SPW_CRD	0x337ea7dd9	6	20	Tailor_Level1_GameplayCo	150	CheckAfterDelay	3,5	0	50	250	0	SpawningPriority_Level2			
60	GPI_BLACK_DAVE_CCLS_ForgingMetal_MID_CRD	0x333483107	6	20	Blacksmith_LeGameplayCo	300	CheckAfterDelay	3,5	0	50	250	0	SpawningPriority_Level1			
61	GPI_BLACK_DAVE_CCLS_Sharpentingool_MID_CRD	0x33237e2e2	6	20	Blacksmith_LeGameplayCo	300	CheckAfterDelay	3,5	0	50	250	0	SpawningPriority_Level1			
62	GPI_LUMB_CAT_CCLS_Walking_SPW_CRD	0x320610a01	6	20	Lumberer_LevGameplayCo	150	CheckAfterDelay	3,5	0	50	250	0	SpawningPriority_Level2			



AC3 HOM - CROWD LIFE Followup - Microsoft Excel																																					
BD106 N/A																																					
Station	CCLS (State)	ANVIL STATION NAME	Location (Approx.)	Godfrey	Terry	Catherine	Diana	Alexander	Jonathan	Charlotte	Samuel	Amelia	Warren	Prudence	Noah	Myrlan	Norris	Lance	BigDave	Ellen	Maria	Lyle	Oliver	Corrine	Thomas	Timothy	Achilles	Faulkner	Sailor	Zoom-able	Profession	Dialog Type	NPC Reaction				
34	Closed	Bee Keeping	GPI_FARM_WAR_CCLS_BeeKeeping Farmer Zone											X															X	Farmer	One-offs	Towards_Connor_Bee Keeping	NPC opi				
35	Closed	Bowls	GPI_LUMB_TER_LYLE_CCLS_Bowls Lumberer Zone		X																	X							X	Doctor	N/A	N/A	Two NP				
36	Closed	Bowls	GPI_LUMB_GOD_TER_CCLS_Bowls Lumberer Zone	X	X																								X	Lumberer	Dialog	N/A	Two NP				
37	Closed	Brushing Horse	GPI_MAN_ACH_CCLS_BrushingHors Manor Zone																							X						One-offs	Towards_Connor_Brushing Horse	NPC bru			
38	Closed	Butchering Pig	GPI_INN_OLI_CCLS_ButcheringPig Innkeeper Zone																					X					X	Innkeeper	One-offs	Towards_Connor_Butchering Pig	NPC cut				
39	Closed	Carrying crates	GPI_LUMB_TER_CCLS_Carryingcrate Lumberer Zone		X																											N/A	N/A	NPC wa			
40	Closed	Carrying crates	GPI_LUMB_DIA_CCLS_Carryingcrate Lumberer Zone					X																								N/A	N/A	NPC wa			
41	Closed	Carrying crates	GPI_MINE_NOR_CCLS_Carryingcrate Miner Zone														X															N/A	N/A	NPC wa			
42	Closed	Changing Bottle	GPI_INN_OLI_CCLS_ChangingBottle Innkeeper Zone																										X	Innkeeper	One-offs	Towards_Connor_Changing Bottle	NPC res				
43	Closed	Changing Keg	GPI_INN_OLI_CCLS_ChangingKeg Innkeeper Zone																										X	Innkeeper	One-offs	Towards_Connor_Changing Keg	NPC rec				
44	Closed	Chase	GPI_HOM_ALEX_JON_MAR_CCLS_Ch Homestead					X	X													X										N/A	N/A	NPC chi			
45	Closed	Chase	GPI_HOM_ALEX_JON_MAR_CCLS_Ch Homestead					X	X													X										N/A	N/A	NPC chi			
46	Closed	Chase	GPI_PRST_THO_CCLS_Chase_SPW Priest Zone																							X						N/A	N/A	NPC pre			
47	Closed	Chase	GPI_PRST_SAM_CCLS_Chase_SPW Priest Zone									X																				N/A	N/A	NPC chi			
48	Closed	Chasing Animal - Shovel 1	GPI_FARM_WAR_CCLS_ChasingAnir Farmer Zone										X																			Dialog	N/A	NPC dis			
49	Closed	Chasing Animal - Shovel 1	GPI_FARM_PRUD_CCLS_ChasingAnir Farmer Zone											X																		Dialog	N/A	NPC dis			
50	Closed	Chasing Animal - Shovel 2	GPI_FARM_WAR_CCLS_ChasingAnir Farmer Zone												X																	Dialog	N/A	NPC dis			
51	Closed	Chasing Animal - Shovel 2	GPI_FARM_PRUD_CCLS_ChasingAnir Farmer Zone													X																Dialog	N/A	NPC dis			
52	Closed	Checking Crops	GPI_DOC_LYLE_CCLS_CheckingCrops Doctor Zone																				X									One-offs	Towards_Connor_Checking Crops	NPC wa			
53	Closed	Checking Crops	GPI_FARM_WAR_CCLS_CheckingCro Farmer Zone											X																		One-offs	Towards_Connor_Checking Crops	NPC che			
54	Closed	Checking Crops	GPI_FARM_WAR_CCLS_CheckingCro Farmer Zone											X																		One-offs	Towards_Connor_Checking Crops	NPC che			
55	Closed	Checking Crops	GPI_FARM_PRUD_CCLS_CheckingCro Farmer Zone												X																	One-offs	Towards_Connor_Checking Crops	NPC che			
56	Closed	Checking Crops	GPI_LUMB_TER_CCLS_CheckingCrop Lumberer Zone			X																										One-offs	Towards_Connor_Checking Crops	NPC che			
57	Closed	Checking Crops	GPI_LUMB_GOD_CCLS_CheckingCro Lumberer Zone	X																												One-offs	Towards_Connor_Checking Crops	NPC che			
58	Closed	Checking Crops	GPI_PRST_TIM_CCLS_CheckingCrop Priest Zone																								X					One-offs	Towards_Connor_Checking Crops	NPC che			
59	Closed	Cleaning Fireplace	GPI_MAN_ACH_CCLS_CleaningFirec Manor Zone																									X				One-offs	Towards_Connor_Cleaning Fireplace	NPC ren			
60	Closed	Cleaning Musket	GPI_HUNT_MYR_CCLS_CleaningMus Huntress Zone														X												X		Hunter	One-offs	Towards_Connor_Cleaning Musket	NPC sic			
61	Closed	Cleaning Musket	GPI_HUNT_MYR_CCLS_CleaningMus Huntress Zone														X												X		Hunter	One-offs	Towards_Connor_Cleaning Musket	NPC sic			
62	Closed	Cleaning windows	GPI_INN_COR_CCLS_Cleaningwindc Innkeeper Zone																							X						One-offs	Towards_Connor_Cleaning windows	NPC cle			
63	Closed	Cleaning windows	GPI_LUMB_DIA_CCLS_Cleaningwindc Lumberer Zone								X																					One-offs	Towards_Connor_Cleaning windows	NPC cle			
64	Closed	Cleaning windows	GPI_LUMB_DIA_CCLS_Cleaningwindc Lumberer Zone								X																					One-offs	Towards_Connor_Cleaning windows	NPC cle			



# MASSIVE DATA MANIPULATION

**DATA**  
TEMPLATE



CREATE **DATA**  
MANIPULATION  
IN **CODE**



# MASSIVE DATA MANIPULATION

DATA  
TEMPLATE



CREATE DATA  
MANIPULATION  
IN CODE

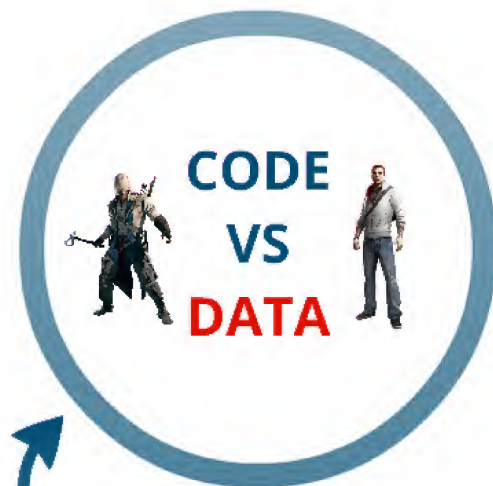
SCRIPTING YOUR EDITOR  
CREATE SPECIFIC TOOLS



**DATA IS POWERFUL  
BUT DANGEROUS**



**CREATIVE AND  
FLEXIBLE TOOLS**



**GENERIC CODE  
EMBRACE DATA**



# CREDITS

Marc-André Jutras  
Thierry Dansereau

The Montreal AC3 team

Marco, Marçal, Sapin, Yoan

The Quebec AC3 team

Wesley, Gabriel, Thierry



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# QUESTIONS

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## THE END

Come and see us at the **UBISOFT** booth  
if you have questions or want to buy me  
a beer. Yes I am easy like that.